MALARIA (ICD9 084.6)

Revised Oct 2005

AEROMEDICAL CONCERNS: Contracting malaria is a risk to aircrew members deployed to endemic regions such as Central and South America, the island of Hispaniola (Dominican Republic and Haiti), Africa, Asia (including the Indian subcontinent, Southeast Asia, and the Middle East), Eastern Europe, and the South Pacific. Malaria is endemic in more than 100 countries and territories and kills over one million people worldwide every year. Widespread occurrence of malaria may result in significant loss of personnel. During the Vietnam War, entire units were declared "Combat Non-effective" due to high incidence of malaria.

Malaria is a protozoan infection that is spread by the *Anopheles* mosquito. Clinical signs and symptoms include fever, tachycardia, hypotension, cough, headache, delirium, vomiting, and diarrhea. The most severe form of malaria can cause seizures, coma, renal and respiratory failure, and death.

WAIVERS: History of uncomplicated, fully recovered malaria does not require waiver and will be recorded in the AEDR as "*Information Only*."

Malaria with severe symptoms (seizures, coma, renal or respiratory failure, other complications) on flight personnel of all classes is *DISQUALIFYING* and will be considered for waiver or exception to policy on a case-by-case basis after full recovery.

Chemoprophylaxis during deployment to endemic areas is not considered disqualifying, but it should be performed under careful supervision of a flight surgeon/APA and with aeromedically acceptable medications.

INFORMATION REQUIRED FOR WAIVER/EXCEPTION TO POLICY:

- ❑ Current infectious disease or internal medicine consultation, documenting treatment and full recovery.
- ❑ Current applicable consultations regarding resolution of complicating conditions from infection.
- ❑ Results of microscopic examination of both a thin and a thick blood smear for malaria.

FOLLOW-UP: No follow-up is required once a cure has been obtained. Service member needs to be aware that the disease can occur months, even years after exposure. Malaria can also recur several months to years after the initial infection. Unexplained fevers and symptoms should be evaluated promptly and the evaluating care provider should be made aware of the service member's history of travel to a malaria endemic area.

TREATMENT: Chloroquine is the first line agent for chloroquine-sensitive malaria. Treatment protocol consists of initial dose of 10 mg base/kg (maximum 600 mg base) orally, followed by 5 mg/kg base (maximum 300 mg base) 6, 24, and 48 hours later. For chloroquine-resistant malaria, first line therapy is quinine sulfate 10 mg salt/kg (maximum 650 mg) every 8 hours for three to seven days, combined with either 3 tablets of pyrimethamine-sulfadoxine (25/500 mg) on day #3 (if the malaria was acquired in an area without significant sulfonamide-resistance); or doxycycline (100 mg PO bid for seven days). New medications that are FDA-approved may be necessary for use as well that have not been addressed in this APL—follow the best practice guidance for medical care. Individuals being treated should be temporarily grounded until recovered, and then processed as outlined above.

PROPHYLAXIS: It is important to consider that chemoprophylaxis is only one component of malaria prevention. Proper wear of clothing, use of insect repellents, mosquito nets, and mosquito avoidance are all important and can also protect against other mosquito borne illnesses.

Approved medications for malaria prophylaxis include chloroquine phosphate, primaquine phosphate, and doxycycline. Single dose ground testing is advised with a 24-hour grounding period. **Mefloquine is not approved for use in flight personnel**. **New medications that have not been evaluated yet or FDA-approved are not for routine use in flight personnel—special cases should be referred to AAMA.**

Recommendations for prophylaxis change frequently due to variability of organism susceptibility to treatment. Prior to deployment to an endemic area, the latest recommendations should be obtained using the Armed Forces Medical Intelligence Center (AFMIC), Fort Detrick (password-secure website at www.afmic.detrick.army.mil). AFMIC should be the primary source of information. In addition to AFMIC, medical guidelines can also be found at the Centers for Disease Control (CDC) online at www.cdc.gov/travel, or the CDC Malaria Hotline (770-488-7788); or at the World Health Organization (WHO) online at http://www.who.int/ith/en.

DISCUSSION: There is growing incidence worldwide of chloroquine-resistance malaria. The proper chemoprophylactic agent needs to be determined on the basis of deployment country or region. Current information on medications can be found at AFMIC. Follow AFMIC recommendations. Recommendations can also be found on other government and/or medical sources (be aware that AFMIC recommendations supersede those of other government or medical agencies). Prophylaxis should begin before deployment and continue 1-4 weeks upon return to home station, depending on the agent used. Side effects to malarial prophylactic agents are usually minor, but can be as serious as psychoses, seizures, retinopathy, and sensory or motor neuropathies. Flight Surgeons should review individual drug information and monitor for side effects and signs of toxicity as well as stay abreast of changing developments.

REFERENCES

Treatment dosages taken from “Drugs for Parasitic Infections”. Medical Lett Drugs Ther; August 2004. online: www.medletter.com/freedocs/parasitic.pdf.

DRUGS USED FOR MALARIA PROPHYLAXIS

[1]Glucose-6-phosphate dehydrogenase. All persons who take primaquine should have a documented normal G6PD level prior to starting the medication.

Drug	Indications for Use	Adult Dose	Comments
Atovaquone / proguanil (Malarone)	Prophylaxis in areas with chloroquine-resistant or mefloquine-resistant *P. falciparum.*	1 tablet PO daily tablets contain 250 mg atovaquone and 100 mg proguanil hydrochloride	Begin 1-2 days before travel to endemic areas. Take daily at the same time each day while in the endemic area and for 7 days after leaving the area. Contraindicated in persons with severe renal impairment (creatinine clearance <30 mL/min). Atovaquone/proguanil should be taken with food or a milky drink. Not recommended for prophylaxis for children <11 kg, pregnant women, and women breastfeeding infants weighing <11 kg.
Chloroquine phosphate (Aralen and generic)	Prophylaxis only in areas with chloroquine-sensitive *P. falciparum.*	300 mg base (500 mg salt) PO once a week	Begin 1-2 weeks before travel. Take weekly on the same day of the week while in endemic area and for 4 weeks after leaving the area. May exacerbate psoriasis.
Doxycycline (Many brand names and generic)	Prophylaxis in areas with chloroquine-resistant or mefloquine-resistant *P. falciparum.*	100 mg PO daily	Begin 1-2 days before travel to endemic areas. Take daily at the same time each day while in the endemic area and for 4 weeks after leaving the area. Contraindicated in children <8 years of age and pregnant women.
Hydroxychloroquine sulfate (Plaquenil)	An alternative to chloroquine for prophylaxis only in areas with chloroquine-sensitive *P. falciparum.*	310 mg base (400 mg salt) PO once a week	Begin 1-2 weeks before travel to endemic areas. Take weekly on the same day of the week while in the endemic area and for 4 weeks after leaving the area.
Mefloquine (Lariam and generic) **NOT APPROVED FOR FLIGHT**	Prophylaxis in areas with chloroquine-resistant *P. falciparum.*	228 mg base (250 mg salt) PO once a week	Begin 1-2 weeks before travel to endemic areas. Take weekly on the same day of the week while in the endemic area and for 4 weeks after leaving the areas. Contraindicated in persons allergic to mefloquine or related compounds (e.g., quinine and quinidine) and in persons with active depression, a recent history of depression, generalized anxiety disorder, psychosis, schizophrenia, other major psychiatric disorders, or seizures. Use with caution in persons with psychiatric disturbances, or a previous history of depression. Not recommended for persons with cardiac conduction abnormalities.
Primaquine	An option for prophylaxis in special circumstances. Consult AFMIC for additional information.	30 mg base (52.6 mg salt) PO daily	Begin 1-2 days before travel to endemic areas. Take daily at the same time each day while in the endemic area and for 7 days after leaving the area. Contraindicated in persons with G6PD[1] deficiency. Also contraindicated during pregnancy and lactation unless the infant being breastfed has a documented normal G6PD level. Use in consultation with malaria experts.
Primaquine	Used for terminal prophylaxis (presumptive anti-relapse therapy) to decrease the risk of relapse of *P. vivax* and *P. ovale.*	30 mg base (52.6 mg salt) PO daily for 14 days after departure from the malaria-endemic area.	Indicated for persons who have had prolonged exposure to *P. vivax* and *P. ovale* or both. Contraindicated in persons with G6PD[1] deficiency. Also contraindicated during pregnancy and lactation unless the infant being breastfed has a documented normal G6PD level.

Note: This information was obtained from "Health Information for International Travel, 2005-2006" a publication of the Centers for Disease Control and Prevention.